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SOME THOUGHTS ON THE RELATION OF NEUROLOGY TO PHYSIOTHERAPY

By J. W. McCONNELL, M. D., Associate Professor of Neurology, Graduate School of Medicine of the University of Pennsylvania; Neurologist to the Philadelphia General Hospital; Neurologist and Psychiatrist to the Howard Hospital; Consulting Neurologist to the West Philadelphia Hospital for Women; to the Oncologic Hospital of Philadelphia; to the Memorial Hospital of Roxborough, Philadelphia

The term Physiotherapy, as I understand it, relates to the treatment of disease by natural agents: air, light, electricity, climate or other physical means. Other "physical means" indicates massage, baths, gymnastics and various exercises. The term Physiotherapy, therefore, should be elaborated to include almost all forms of remedial agents other than drugs and surgery. In a recent number of the Atlantic Medical Journal there appeared a list of fifty-nine methods of popular, successful or unsuccessful cures, among which Physiotherapy was mentioned. In reading this over I was quite sure Physiotherapy should embrace many of those mentioned, and, additionally, I felt it should not be regarded as a healing art in the sense in which napropaths, drugless healers and others advertise their modes of treatment as definite professions.

One of the many reasons, in fact almost the principal reason, for the value of Physiotherapy in neurologic disorders is found in the anatomico-physiologic relations of the nervous and the muscular systems. The centers for ordinary muscular movements are located in the cerebrum, or, more exactly, in the cortex of the cerebrum. This statement refers not only to motor centers but also to those sensory centers which of necessity must have a part in any movement. In the cerebrum, not remote from these motor and sensory centers, are located the higher intelligences: thought, will and emotion. The active association of these great areas in the functions they subserve is essential to the production of conscious purposive movements. By that is meant, any movement, no matter how simple or how complex, depends upon the action of thought, will or emotion in the ordering of flexion of the forearm, extension of the leg or winking of an eye. Whether you consider these movements from the message-receiving standpoint or the impulse-sending standpoint is immaterial; there must be absolute cooperation between the various portions of the cortex in order to produce perfect movement.

Lower down in the brain are found the cerebellum, the ponsoblongata and the spinal cord. Without going deeply into the abstruse physiology and anatomy of these structures, the blanket statement can be made that in them are located centers, if one might so call them, for automatic movement or if one might be allowed a paradoxical expression, unconscious purposive movements. I mean by that, an individual who is constantly making the same movement, as for instance hammering, planing or pedalling a sewing machine, by

reason of the repeated identical movements, sooner or later performs these movements without any effort of the will and they then become automatic or, as I choose to call them, unconscious, purposive movements. Continued combined effort of the higher intelligence centers and of the motor and sensory, cortical, centers in ordering the execution and bringing about the performance of purposive movements, sooner or later produces a state of fatigue, which if muscular activities are persisted in, becomes exhaustion. Automatic movements or unconscious purposive movements, on the other hand, may be performed for a far greater period of time without the occurrence of these changes. This gives us the key to one phase of the relation of Physiotherapy to neurology, namely the treatment of the functional neuroses, those diseases in which nerve structure pathology cannot be demonstrated. The stimulation of muscle fibers that have definite connection with the cortical centers brings about increase in their fuctional ability. This is the physiological result of the application of both active and passive exercises. In the organic neuroses, those with demonstrable pathology, something has interfered with the passage of impulses either from or to the parts to be exercised. The repeated gentle stimulation of the imperfectly acting structures, provided there still is some cerebral connection, not only improves existing functions but also frequently elaborates it. When the connection with the cerebral cortex is completely severed, our attention must be paid in a treatment way to those structures which still have cerebralward pathways and make them do their part toward the restoration of function. This gives us the key to another phase of the relation of Physiotherapy to neurology and opens up the possibilities of systematized gymnastics in the treatment of certain organic diseases such as tabes dorsalis, paralysis agitans, with its close relative the Parkinsonian syndrome that follows encephalitis; the hemiplegias following cerebral apoplexy; and other forms of loss of power due to structural change in the nervous system.

Physiotherapy, with relation to functional diseases of the nervous system, is a pretty old affair. Of late years in this country it seems to have a definite connection with the so-called "rest treatment." Rest treatment was a practical modification of the so-called "rest cure" of Sir Lyon Playfair, imported and made worth while by Weir Mitchell, for the purpose of bringing back to the normal, individuals who, as the result of anemia or nervous exhaustion, were in need of rest and exercise. Of late years the method has been removed from the realms of neurology and been given wider scope by numerous lines of medical specialists and modified to such a degree that its originator would hardly recognize his child. One of its principal features was massage and the "Weir Mitchell treatment" more than anything else helped to elaborate the use of that therapeutic agent.

It is always a source of interest to see how often and how easily

the individual treating a patient with massage fails to make a success of that particular line of treatment with a given patient, and if one analyzes the situation one is impressed with certain salient features which many practitioners fail to recognize. A fundamental of the practice of Physiotherapy should be a working acquaintance with physiology and anatomy so that the operator may recognize how far from the normal the patient is when treatment is started and what improvements are made as treatment is continued. Take, for instance, a case of infantile spinal paralysis, so-called poliomyelitis. The case is badly paralyzed in all four extremities. It is necessary to restore the function of those muscle fibers the nerve cells of which are not completely destroyed. If the operator is not possessed of a knowledge of the normal action of the paralyzed muscles as well as of those not paralyzed; if the possibility of substituting the performance of one muscle for that of another is not known; if the reason for contractures, for faulty position, for bends and twists is not within the ken of the one giving massage, the work done is not only a failure but is doing harm of an extreme kind and results disastrously if continued. Still another fundamental. Massage in some conditions must of necessity be carried on for a long period of time and the one administering it becomes almost of as much importance as the medical person who is superintending the attempted recovery. Suppose the patient is a person who is more than a child. Suppose it happens the patient is a boy of eighteen years who, previous to the onset of the condition, was a healthy, energetic, ambitious youth and, having been in business for a time and accumulated a small amount of savings, had visions of big business and expected some day to be a rich and influential man. It is not to be wondered at that a patient of this kind, helpless for months, should question his own life and wonder whether effort at recovery was worth making. It is not surprising that he becomes depressed and fault-finding. In the handling of a person of this kind certainly the physiotherapist must either be possessed of a psychology that is buoyant and hopeful and courage-producing or else the treatment might just as well be discontinued. To be sure, one of the cardinal principles of massage, so far as a certain type of nervous invalid is concerned, is absolute quiet and absence of conversation between the patient and operator; but not all neurological cases call for such handling and a patient of the kind just described needs not only encouraging conversation by an intelligent manipulator but also needs little bits of information carried in from the outside world; things that are likely to fill in the dark moments of his days and give to him something other than the medical side by which to remember the operator. Therefore, very important qualifications in the practice of Physiotherapy are: a more than working acquaintance with the anatomy and physiology of the human body; a thorough and correct technique in giving massage; the possession of a psychology that is without depression or oppression; one that is

almost invariably uplifting and inspiring; that is on the qui vive for new methods that will keep the patient from believing that the treatment is a sterotyped affair that must be persisted in for weeks and months, always the same. Ordinarily, where massage is used as part of a general tonic treatment, the condition of absolute quiet on the part of patient and practitioner should be maintained but in those instances of chronic neural disorders, which take weeks and months of treatment before much improvement is noted, it is very necessary to afford the patient some pleasure other than mere treatment and to give them some thoughts other than are brought to them by the manipulation of the masseur or masseuse.

Among my earliest experiences in the practice of medicine, while I served as an office assistant to a man who had a large neurologic and psychiatric practice, was the handling or instruction of patients in that branch of Physiotherapy which is called systematized rhythmic exercises. In doing this we endeavored as far as possible to eliminate the patients' own will, and by allowing them to imitate, we endeavored to teach them to accomplish various movements. The addition of deep respiratory movements helped materially, not only in fixing the patients' mind on something other than themselves, but also in increasing their oxygen intake and in improving the blood states such as were found in most of these patients. In doing this work, the importance of teaching by imitation rather than by command was kept in mind and it was not a great while before a patient suffering from St. Vitus dance could so control conscious movements that the incoordinate choreic muscular activities ceased to exist. Later these patients were taught to respond to word of command not only as to the movements of the limbs but also as to breathing and by degrees the latter was modified according to various methods with excellent results.

The class of diseases known as occupational neuroses has always seemed an excellent field for the labors of the physiotherapist. Sir George Vivien Poore many years ago called attention to the conditions of fatigue that were undoubtedly etiologic factors in the production of these neuroses and if you will revert to the statement of a little while ago relative to the ease with which conscious purposive movements become fatiguing, you can readily see a working principle in the handling of writer's cramp, piano arm, blackmith's arm, etc. Poore's idea was that the muscles that were exhausted were not to be allowed to degenerate by reason of lack of use, but rather with systematized rhythmic exercises applied to the muscles involved to obtain restoration to health. Of course, he combined these exercises with galvanic electricity and insisted on freedom from the usual occupation, and the resultant improvement was most remarkable in many of the cases reported by him.

I have wandered through devious paths this evening, touching on several topics concerned in the great subject of Physiotherapy. I

hope that I have been able to suggest something that will be of advantage to you in the pursuit of your occupation but I would like to be just a little bit personal with you before I leave. You are all aware of the flood of curers, the therapists of one kind or another, with which our country is afflicted. Some of you perhaps are acquainted with these various doctors, professors and teachers. I have knowledge of some of them and it has interested me to find that a man can for years be a professional boxer, yet in a few months become a doctor of a certain healing art and for a time, at least, make a measure of success at it. I have close and positive knowledge of a man who was not able to complete his grammar school education, who never saw the inside of a high school, yet who was able in six months to inform the general public that he practiced a form of so-called Physiotherapy, and that following this announcement he was for a time, at least, up to my losing sight of him, well patronized by supposed-to-be-intelligent, thinking individuals. Indeed, I had the very interesting experience of being asked to have him in consultation one time in a case of typhoid fever.

This is the day of unrest. Everybody is looking for something new or something more interesting than they had previous to the late unpleasantness in Europe. The various methods of treatment, the different cults and the multitudinous therapies offer a lovely solace to lots of individuals who have nothing wrong with them except too much money and too little wit. It seems to me that organizations such as this should stand for training, for education, for refinement, for all of those things which will help to prepare any individual for an association in the sick room that means intimacy, a friendship that is unusual and a contact that may be fruitful either of good or of evil.

1904 Chestnut Street, Philadelphia, Pa.

THE MENTAL ATTITUDE OF THE CRIPPLED CHILD IN RELATION TO ORTHOPAEDIC TREATMENT

By DEFOREST P. WILLARD, M. D.*

In the past quarter century the problem of bringing back to normal the physically handicapped child has assumed far greater importance and is receiving more and more consideration from many and varied interested groups. In the past, individual efforts of orthopaedic surgeons were the only advance made in this line. Today, in addition to numerous charitable organizations, nations, state and city are giving their best efforts to solving this question.

For the sake of brevity, the problem of the child whose physical defects are such as can be materially helped by surgery and who are of normal mentality, is to be considered here. The large group of cases, in which physical and mental defects are combined, needs entirely different methods and cannot be taken up in this paper.

As our combined knowledge grows, the need of attack, from the mental as well as from the physical side, is more and more emphasized, and the orthopaedic surgeon is realizing that physical correction of anatomical defect plays only a part in this problem.

The fact that a child has some physical deformity creates, as an additional handicap, a deformed attitude in that child. He realizes at a very early age that he is different from other children; that he is unable to enter into their usual occupations and enjoyments; and that he is more dependent on the help and support of others than the normal child. He, therefore, loses, to greater or less degree, his desire to become as other children are.

This mental attitude of the crippled child in its relation to orthopaedic treatment falls into three main phases: first, the period before the child has been hospitalized and is still under the control of its parents; second, the period of hospitalization, in which all physical means to reconstruct the individual human machine are employed; and third, the long period of after-care in the home.

In the first period these children, because they are physically handicapped, occupy a unique position in the home. They naturally become the centre of the family interest, and their wants and whims are considered above and before those of the other members of the family. Such a child quickly comes to realize this situation, and feels that no mental or physical effort on his part is necessary, and that his family is there solely to minister to his support and comfort. The result is, of course, a child who will not cooperate in any way with any line of treatment that may cause physical or mental effort or discomfort. Obviously, such a state of mind is a tremendous handi-

*Reprinted by permission from the Crippled Child.

cap to any future efforts towards rehabilitation. Prevention of such a condition lies in the hands of the parents, but they must first be taught to realize that such a condition can and will occur, and that for the ultimate good of the child his life must be made to correspond to the lives of other children as closely as possible. In this period the problem is more the correct training of the mental attitude of the parents than of the child.

In younger children it is of the utmost importance that the parents learn to treat the physically handicapped child as a normal member of the family group; to make him realize that he must share with the others; that he must obey the household rulings as do the others, and that he is no more immune from punishment than any other child. If this spirit of cooperation can be first instilled in the child, it will aid materially in his after-treatment.

In older children, those over ten years of age, ambition to better their condition can be added to the spirit of obedience. The mental attitude of the whole family plays a very decided part in increasing the child's own desire to help himself. If the family attitude is one of hopeless acceptance of present conditions, the handicapped child will easily develop the same feeling. If, however, the child has constantly kept before him the fact that he can be and will be improved, he naturally will cooperate in any lines of treatment that are being used to help his physical condition.

The period in which this child's mental attitude plays an important role in his treatment is during the time of his hospitalization. During this period he undergoes the greatest amount of physical pain and discomfort and, therefore, is more likely to become discouraged and incooperative. On the other hand, it is during this period that his physical defects are most rapidly overcome and this feature can usually be used to neutralize the discouragements attendant on the discomfort that he must endure. When the handicapped child first comes to the hospital, the faults of his earlier training must be corrected. He needs to be taught that he is now one of a larger family group, each one of whom must learn to obey and to cooperate with the rest. The nursing and the teaching staffs are all important in producing this state of mind and our best orthopaedic nurses become, unknown to themselves, keen psychologists as well as skillful, surgical assistants. The other ward patients also become aides in producing the correct mental attitude of the newly admitted cases. In all well handled orthopaedic wards, there develops an *esprit-de-corps* that frowns upon the slacker and shows favor to him who pluckily surmounts the discomforts of the long treatment. The spirit of competition is also a most useful aid in carrying out the long and tedious gymnastic exercises which play such an important part in physical reconstruction. Whenever possible, the children are placed in classes for this type of work, and they are encouraged to vie with

each other in carrying out the various exercises. In this way the slackness which comes with constantly repeated exercises can be eliminated, and the gymnasium becomes a playground instead of a workroom. In addition, the children are mentally stimulated by the public school courses which are carried on in the hospital. By keeping their education at the same level as that of other children, the feeling of mental inferiority is prevented when they again come in contact with normal children after leaving the institution.

In the third phase—the after-care in the home—the mental attitude of patient and parent is no less important than in the hospital period. In most instances patients will need constant supervision in the out-patient department for several months after their discharge from the hospital. During this time careful brace supervision and continuous home exercise are very essential parts in the rehabilitation process. The monotony of these procedures is very wearing on both parent and child, and unless they can be made to realize the importance of this part of the treatment, the final result may be seriously impaired. A curious but very common family attitude is often seen in this phase of the treatment, in the neglect of braces that have been applied. If these braces have been paid for by the family funds they are usually well taken care of and faithfully worn. If, however, the hospital has supplied the braces free of charge, the usual tendency is to discard them as soon as they become broken, or even when they cause discomfort. The surgeon and his social service aides must constantly be on the watch for this attitude in the home and see that the patient correctly applies and wears the apparatus that has been given him.

In the later stages of home care the patients can be classed in two main groups—those whose physical deformities have been practically eliminated and those in whom there is a permanent physical handicap. In the first class, the children have to be trained to recognize the fact that they are both mentally and physically fit to take their place with other children of their age and that they are not now entitled to any special consideration. Their parents must be made to realize that their child is no longer the object of special care and solicitude and they must use all their influence in forcing him to consider himself in every way a normal child.

The second group of cases, those in which some permanent physical handicap persists, need mental training along slightly different lines. They must be taught to disregard as far as possible their physical defect. They must be carefully studied with the idea of finding their mental and physical capabilities in reference to future wage earning and they must be helped and urged to make the best of these capabilities.

The orthopaedic surgeon has come to realize that no matter how perfect is his hospital equipment, no matter how expert he himself

may be in the art of reconstructive surgery, his results in bringing back to normal the crippled child will fall far short of his ideals unless the child himself has been trained to put forth his best efforts to assist in the reconstruction program. This spirit of cooperation varies greatly in each individual child, but it can be increased or lessened, to a great degree, by the mental atmosphere of the home, or of the hospital in which he lives and the ultimate, successful outcome will depend on the team work of the surgeon, of the parents, and above all, of the child.

AN APPARATUS FOR THE REEDUCATION OF MUSCLES FOR OVERCOMING CONTRACTIONS AND FOR THE BREAKING OF ANKYLOSES

By ANNA S. KITE, Directress in Charge of the Orthopedic Gymnasium of the Hospital of the University of Pennsylvania.

The accompanying illustrations give an idea of an apparatus devised by me, for the reeducation of paralyzed muscles, which has for its recommendation simplicity, cheapness and practicability.

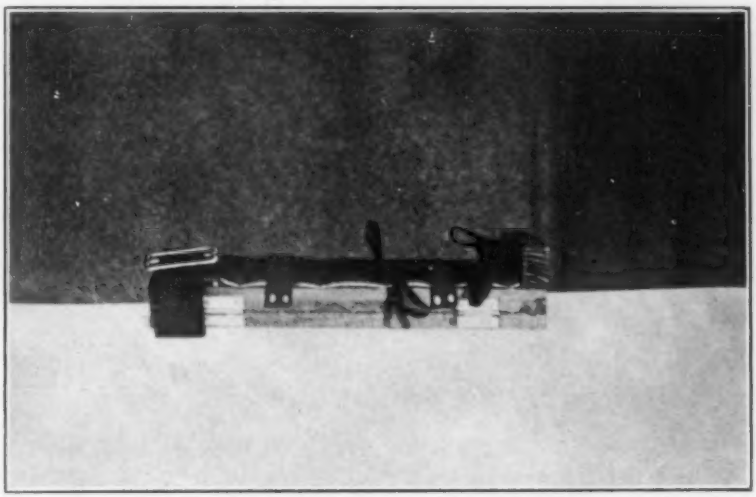

Figure 1. The device consists of two pieces of board, twelve by six inches by three-quarters of an inch, which are hinged lengthwise one and a half inches from each end of one side. On the other long side of the boards, two inches from each end, are placed brass screws, the heads of which are three-sixteenths of an inch in diameter. The upper board is padded and leather covered, and fastened at one end is a piece of board one and one-quarter inches high and three-quarters of an inch thick. To this are attached elastic webbing holders for fingers, and on the side of the long board is another holder for the thumb. Three bands of one inch wide elastic webbing are fixed to the long sides of the upper board, the first one two inches from the upright; a second, one inch from the first; and a third, separated by two inches from the second. An inelastic webbing strap with an adjustable buckle is attached to the extreme end of the top board.

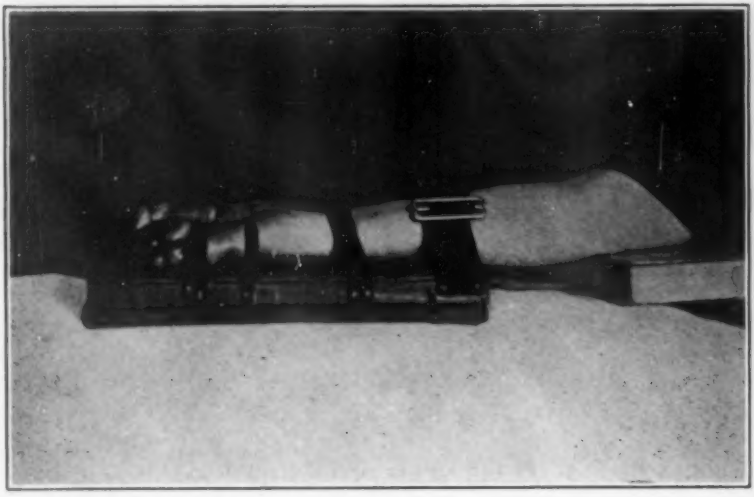

Figure 2 shows the hand and forearm in supination, the fingers and thumb being flexed against the elastic holds.

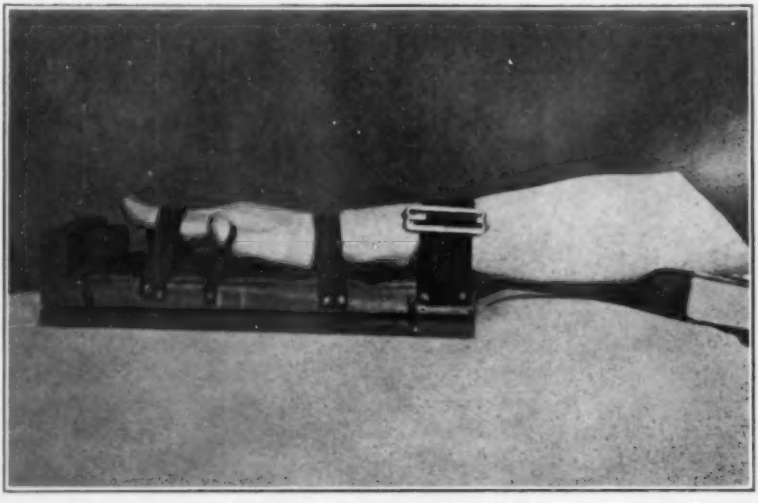

Figure 3. The hand and forearm are in pronation, the fingers are placed under the wide band, and the thumb in the elastic holder for resisted hyperextension.

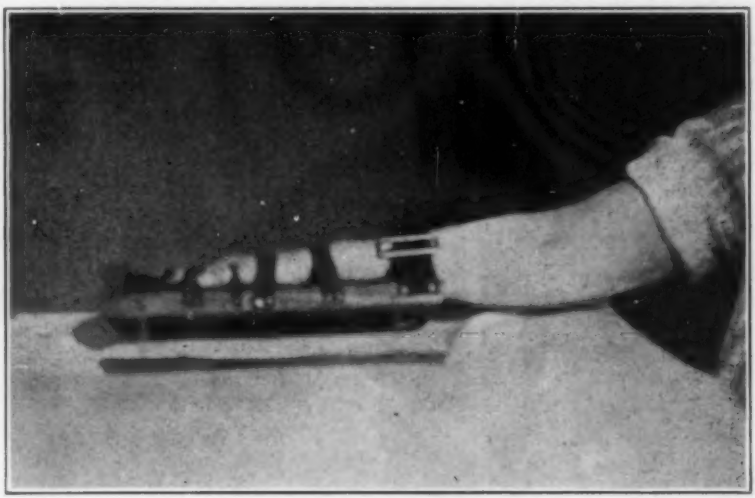

Figure 4 shows how rubber bands connecting the screws on the side of the device give resistance in making supination of the hand and forearm. The apparatus has been utilized in similar manner in the treatment of inversion and eversion of the foot. A modification of the device has two boards, equally divided, and the two padded parts six inches long are hinged, one-half being made fast to the under board. Four bands of one inch wide elastic webbing are firmly fastened to one side of the upper board. The other ends of the webbing are fitted with brass rings which can be slipped over the screws meshed in the side of the board. The first band is two inches from the end, the second one inch from the first, the third one-half inch from the hinged end of the back board, and the fourth is three and a half inches from the third.

At the forward end of the device and one inch from the side of the upper and the lower boards are screws. These hold rubber bands which give resistance in flexion, extension and hyperextension of the wrist and elbow.

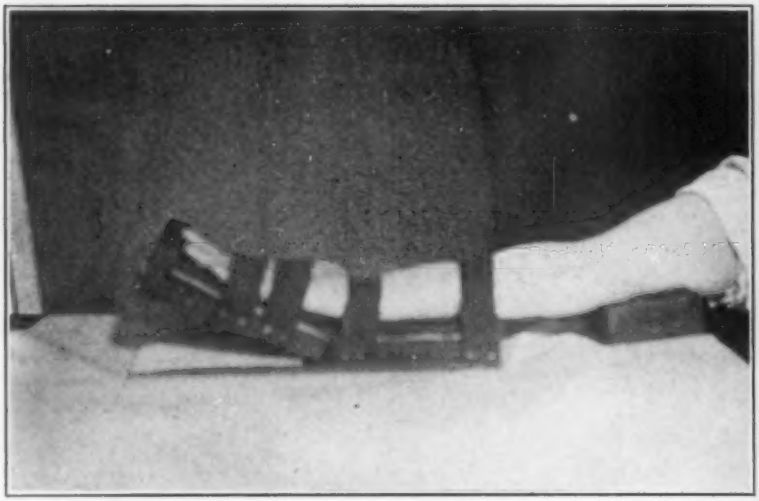

Figure 5 shows the hand and forearm in supination, while the wrist is flexed against the resistance of rubber bands.

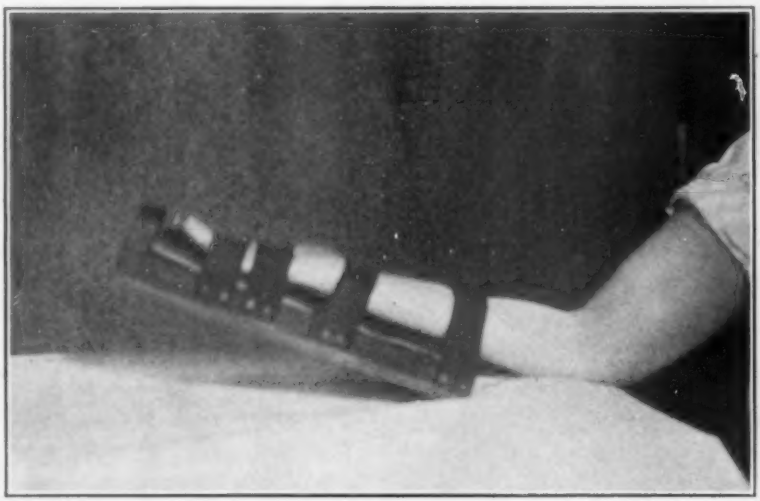

Figure 6 shows flexion of the elbow, using the apparatus as a counterweight.

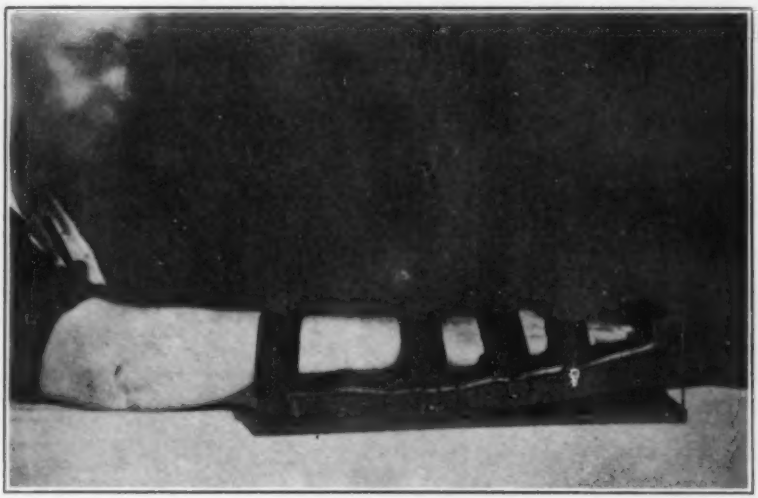

Figure 7 demonstrates hyperextension of the wrist, resisted by rubber bands.

This hinged apparatus has been successfully used in giving resistance treatment for various conditions of the ankle joint.

SYNOVITIS OF THE KNEE JOINT

By THEODORE E. ORR, M. D.*

Before considering some of the important problems involving the knee joint, let us briefly review some of its interesting anatomical and physiological features.

The knee is placed half way down the extremity, hence it has the bulk of the body to support. The bones making the joint are the longest in the body, namely the tibia and femur, therefore the lever action is great, necessitating strong ligamentous attachments to firmly brace it, and at the same time permitting free range of motion. The motion is a complex one and not a hinge joint as is commonly thought. The main movements are extension and flexion—extension to a straight line or 180 degrees and flexion to about 45 degrees. The motion is a combined gliding and rolling and as Morris, on "Joints," has pointed out; as extreme extension ends, the leg rotates a little outward through a longitudinal axis, and as flexion begins it rotates inward. These rotary movements are slight. It is of importance to appreciate why the knee is flexed following injuries or when diseased, particularly when we have an effusion.

First. When flexion has proceeded to 150 or 155 degrees, the joint becomes loose and this increases as the knee is further flexed; in other words, the capacity is greater. The maximum capacity is equivalent to the minimum pressure.

Second. Flexion relaxes the ligaments and tendons.

Third. There are six flexors and four extensors of the knee joint with the same innervation. The flexors are more powerful than the extensors, therefore when the articular twigs of the obturator sciatic and anterior crural nerves are irritated by disease, and both the extensors and flexors contract reflexly, the flexor predominates. This explains why, in cases of injured or diseased hip, pain is often complained of in the knee.

Rotation of the knee, though slight, is of practical importance, because injuries and treatment are intimately associated with the presence of rotary movements. No rotation is possible when the knee is fully extended, the bones then being immovable. For instance, in the treatment of a dislocated semilunar.

The knee joint is between the femur, tibia and patella. The fibula does not enter into it. The patella is a sesamoid bone developed in the quadriceps tendon. The rounded condyles of the femur fit into the cupped tuberosities of the tibia, forming two separate lateral joints. The combining in this way of two joints, side by side, to form one, adds to its strength and lateral stability. The strength of the knee is further assured in that nature has provided fourteen

*Notes on a talk given by Dr. Orr to the Pennsylvania Physiotherapy Association, Inc.

ligaments and the bond of union is so strong, dislocations are rare.

Realizing the number of ligaments and tendons affording support to the knee joint, we can appreciate the necessity of so many bursae, primarily to prevent friction. The bursa most commonly involved are the prepatellar bursa, and the supra-patellar bursa. The latter is connected with the knee joint in 8 out of 10 cases; whereas the former is rarely connected, though frequently involved and commonly spoken of as "housemaid's knee. The synovial membrane of the knee is the largest and most extensive in the body."—Gray.

The knee joint is frequently the seat of injury and disease; of minor injuries, due to its superficial position, exposing it to weather, injuries, wrenches and strains. The factors, competent to make it strong, are not able to protect it from disease.

Synovitis of the knee is an irritation of the synovial membrane. Synovitis may result from trauma, or puncture wound or bacteria or their toxins, carried through the blood stream. There are many types of synovitis. We will deal particularly with some of the common types.

First. Traumatic synovitis may result from direct trauma, as a fall on the knee or a blow. Also, indirectly due to strains or wrenches. One of the most common injuries due to indirect trauma is that of dislocation of the internal semilunar cartilege. In these cases effusion is rather rapid and quite extensive; there is usually no infection. In examining these cases we are able to locate definitely the seat of pain and tenderness, which is helpful in our diagnosis as to the cause and treatment.

Second. Synovitis, the result of infection, may be due to puncture wounds; that is, a direct infection; indirectly, when carried by the blood. Infections vary in their manifestations, according to the type of infection; for example, gonorrheal infection. The symptoms are rapid in onset, the knee is red, hot and swollen, very painful to the touch, marked effusion and the slightest movement is painful. During the acute stage it is unwise in many cases to apply heat, for I have seen several that have been made distinctly worse. After the acute stage has subsided, the application of local heat and massage is of advantage. This I will discuss later.

In contrast to the acute infections, let us consider that of tuberculosis. It is a chronic, destructive disease, slow in onset. In the former there is marked effusion, with very little synovial thickening in the latter; early synovial thickening but not marked effusion; gradual limitation of motion, not acutely painful, remission of symptoms, etc.

For the past year or more, I have been particularly interested in cases of bilateral synovitis occurring in children between the ages of 8 and 12 years. So far, there have been more girls than boys.

There is a marked non-painful effusion, negative history and laboratory findings. In some of its characteristics it closely resembles intermitten hydrops. Of this type of synovitis, with effusion, I will have more to say at a later date.

Now as to treatment, particularly the local application of heat and massage. During the acute stage the synovial membrane is congested, swollen and there are minute hemorrhages. Effusion is due both to inflammatory changes and the natural increase in synovial secretion. After the first stage of acute inflammation, lasting a day or possibly a week, the second stage of absorption of effusion and restoration of function begins. Local application of heat is most advantageous at the end of the acute stage. The heat produces relaxation of tissues, particularly of the voluntary and involuntary muscles and fibres, and it aids chemical activity or metabolism. The blood vessel walls are relaxed and the vessels dilate. By reason of both of these conditions a greater amount of arterial blood flows to the part, bringing oxygen and food. The continued heat promotes oxidation, upon which depend the normal physiological and mechanical functions of the various parts and members of the body. The increased blood flow carries away the products of oxidation so that they do not remain as local poisons or irritants but are excreted from the body through natural channels.

WHY STUDY KINESIOLOGY?

By LEONARD D. FRESCOLN, A. B., M. D.,
Lecturer on Kinesiology, University of Pennsylvania

To the physiotherapist, necessarily studies must be for the most part practical; but in order to attain systematic and rational methods of treatment, these studies should be prefaced by a familiarity with basic principles of anatomy. This applies to all lines of practice and especially to one so constantly referring to levers in its special phase of mechano-therapy.

The human body frequently has been compared to a complex machine. It is much more than this, with all its intricate coordinated mechanisms effecting delicate movements under wonderful nerve control. Mechanics is the science that deals, on the one hand, with statics having to do with the action of forces resulting in rest, and on the other hand, with dynamics having to do with forces producing motion. Kinetics is the science that treats of movements in themselves. The medical profession has coined the word "Kinesiology" to mean the study of bodily movements.

Now, in order to intelligently grasp the real functioning and care of our motor system, we should be well acquainted with its construction—general origin and insertion of the main muscles and muscle-groups, normal range of movements and even, in an outline way, nerve supply, just as the artist should known surface anatomy; the intermist, regional anatomy; and the operator, surgical anatomy. In the same way all physicians, and the orthopedic specialists in particular, should keep reviewing this matter of muscles and their actions in order to get the best results in their work.

We have only to glance at the field of Physiotherapy to see how closely it is coupled up with both the proper hygiene of muscles and the prevention of any trouble connected with them, as well as the handling of deformities already developed and dependent largely upon muscular action. The application of muscle studies to every day acts, special gymnastics, athletics, games in competing and industrial vocations will prove of great interest and value.

Let us examine a few concrete examples of applying Kinesiology to Physiotherapy and see, as we should, the reason for prescribing as we do. We need not have to go into the matter of measuring the amount of force to be expended, but always have a picture, as it were, of the workings of a normal, average, well-built, symmetrical individual for a basis of comparison. The terminology used by the physician in sending a case for treatment always is to be understood and along these lines, in order to carry out the proper indications for the given case. Sometimes a physician does not or cannot specify the exact measures to be employed, and then it is all the more important for the one actually handling the physical treatment to know

just what is being done by each movement. In assuming the proper erect posture—position of the soldier, e. g.—the great extensor muscles stand out, the erector spinal along the back, quadricaps in front of the thighs for the legs and the rhomboid adductors of the scapulae; likewise the hamstring tendons back of the knee are tense.

Now let us examine a case of "habitual abduction of the scapulae" from improper holding of books while reading or a slouching position in writing, sewing, etc. Naturally, this condition calls for the employment of the Swedish exercise "neck firm"—holding the hands back of the neck and making tense the trapezius which extends from the skull and upper spine to outer clavicle and scapula; also the rhomboids (from spine between scapulae to inner borders of scapulae) are put into play, and also the levator anguli scapulae on each side, extending from upper four cervical vertebrae to superior angle of the scapula. In this way the shoulders are pulled up and back, allowing free respiration. "Arms up," with chin in, likewise is to be used here, as also "chest firm," to be described presently. The deformity of winged scapulae, as seen in tuberculous chests, is to be corrected by "shoulders firm," having the hands curled above the shoulders and thus bringing out the rhomboids and exercising the lower servatus magnus, which runs from ribs to front and inner border of scapulae; at the same time the pectoralis minor (extending from third, fourth and fifth ribs to coracoid process) is put on the stretch. The deformity of round shoulders—with abduction, as from bad position in school—is to be corrected by "chest firm," with arms horizontal and hands curled against front of shoulders, because this brings into action the latissimus dorsi, which runs from lower thoracic and the lumbar vertebrae to humerus and pulls shoulders back. Uneven shoulders, as found in lateral curvature and in the congenital Sprengel's scapula, can be treated by stretching the one upper extremity up and the other down. When no scoliosis exists, have the patient frequently shrug the lower shoulder, bringing into play the levator auguli scapulae and first and second portions of trapezius on that side. Alternate this with "neck firm" on that side. Funnel chest may be given deep breathing exercises, bringing into play not only intercostals and diaphragm but also the accessory muscles of respiration—pectorals, scaleni and abdominal muscles. These cases, however, do not seem to improve as readily as chicken-breast and rickety chests. In pigeon-breast cases pressure is made over the sternum during deep inspirations.

With paralysis of the lower fibers of the servatus magnus, which normally raise shoulder up beyond 45°, the scapula on that side fails to come forward; therefore, seeing such a case, we know where to attempt to direct our remedial measures. In brachial birth palsy, the abductors of the arm (deltoid—from outer clavicle and scapula to upper 1/3 of humerus, and supraspinatus—supraspinous fossa to

greater tuberosity of humerus) may be markedly involved, and perhaps the external rotators (teves minor from anterior border of scapula and infraspinatus from infraspinous fossa to greater tuberosity) may be found affected; also there may be a flexor and supinator (biceps) weakness and even wrist drop from involvement of posterior interosseous nerve. Therefore, in handling these cases, the arm is to be treated in the position of abduction with external rotation and the forearm flexed and supinated with perhaps the hand extended in order to allow the parts of the flaccid muscles and stretched nerves to become approximated. Generally, at first an airplane plaster splint is employed. Claw hand demands a stretching of the flexed terminal phalanges as by a cock-up splint, together with the proper exercises. Swings for the putting muscles, bars for the pushing, and stairs for the ilio-psoas and glutus-maximus are used. Pronation and supination and finger exercises are carried out for weaknesses.

Coming now to the spine, let us consider in the first place and briefly the condition known as torticallis or wry neck. From the standpoint of both kinesiologist and physical therapeutist, barring cases from cavies of servical vertebrae, the sterno-cleido-mastoid is generally at fault, on tension. It is supplied by the eleventh cranial or spinal accessory nerve. The muscle runs from the inner and upper sternum and clavicle to the mastoid process of the temporal bone. It pulls the back of head back, down and to same side while the chin goes up and to opposite side. (The first portion of trapezius has similar action.) So in these cases the lower tendon is generally stretched and massaged, whether coming later to operation or not. One of the most important conditions for us to consider is scoliosis or lateral curvature. First of all, properly adjusted seats at school are to be used in order to prevent the trouble, as also vertical handwriting and proper gymnastic, automatic and symmetric, rhythmic movements. When the deformity exists, as it may from birth, general light bell exercises, or German resistive movements are regularly employed to correct, bringing into play all muscles just to the point of fatigue. Later, heavy dumb-bells and weights on the head are used for the spine; bendings in prone and supine positions, especially with reference to the muscles of the sides of deformity are carried out—preferably every day. This is all alternated with a period of pressure and fixation. Then again exercises—first straight standing, then flex and extend forearms in position of supination ten times, pronate, breathe deeply, abduct one arm at a time, then both, stretch and stand on toes, step and thrust, bend, shrug, lean sideways, cross arms, squat, foot out and back, raise leg, exercise abdomen, heave chest from supine position, make oblique strides; then trunk-raising pesisted, etc. You can see how these exercises bring into play abductors, adductors, flexors, extensors and rotators of extremities, head, neck and trunk.

As to just a few more procedures. The bicycle brings into use the abdominal group as well as extremities and shoulder-girdle. Rope climbing and horse-back riding develop particularly the thigh abductors. Passive motion, also, particularly in disease, must not be overlooked. Thus, defects in the young may be overcome by free work, setting-up exercises, use of apparatus, such as trapeze, rings, wall-ladder, wands and so on. Forced breathing must not be forgotten. Then running, fast walking, medicine-ball and various forms of sports are suitable for those brought up to them; also the Schott resistire exercises, where the heart-muscle needs strengthening gradually. The Zander apparatus is used more particularly for deep muscular vibration.

One should know the normal range of movement that the muscles about a given joint can perform. For example, the scapulae, which are usually about four inches apart, may be moved laterally six inches, elevated and depressed there four inches and rotated 60°, shoulders move up and forward 120°. Ordinary abduction of arm, by servatus magnus and deltoid, is 90°; if extended, only 45°: rotation, 90°; extension, 30°; flexion at the elbow is 120° to 150°; pronation and supination, 180°; thigh flexion is normally 150°; abduction, 45°; rotation, 90°; knee flexion is 135°; external rotation, if flexed at 90°, 60°; ankle flexion from a point at 60° to 135° (extension being 45° of this range); wrist flexion and extension, 60 to 90° (45° of overextension), abduction, 45° and adduction somewhat less. The thumbs may be abducted 90°. The brim of the pelvis is 50° to the horizontal.

Infantile paralysis is responsible for weakness and wasting of important muscles. Very frequently the foot is involved. Indeed, from various causes the foot may be weakened and deformed and need correction—exercises and support. Exercise for flaccid feet with poor arches consists in walking on outer surfaces pigeon-toed, thereby pulling with Tihiclis Anticus, Achilles tendon and flexors; also rising on toes and heels; grasping little cubes with toes when leg is across other, sitting on the floor, and placing these cubes to the other side; having feet parallel and grasp a towel with the toes; rotating knees out while keeping feet on the floor; flexing and extending toes over edge of a table. We see, therefore, there is a reason for each active exercise and passive movement. By concentrating on the mechanical leverage involved, and the muscle control, proper results will be obtained by seeking with care.

OFFICERS AND EXECUTIVE COMMITTEE OF THE AMERICAN PHYSIOTHERAPY ASSOCIATION, 1928-29

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DR. FRANK B. GRANGER

On Oct. 23, Dr. Frank B. Granger passed on after a painful illness, courageously borne. Over twenty years ago, Dr. Granger was a pioneer in X-ray, before the days when precaution was considered necessary for the operator.

It is owing to these pioneer X-ray days that Dr. Granger's untimely death in his early fifties took place; his life was laid down on the altar of sacrifice.

No person sought help, comfort, or consolation in vain from Dr. Granger. He was always cheerful, with an inexhaustible supply of ready wit ever uppermost, always willing to lend a helping hand to a needy person or a worthy cause, with a heart brimming over

with love for his fellow beings and an understanding heart for human frailties.

In the early part of 1918, Dr. Granger was appointed head of the Physiotherapy Section of the Reconstruction Department of the U. S. Medical Corps, a branch of medical science not recognized by the great majority of the medical profession. In two years time, not only did the entire Medical Corps recognize Physiotherapy, but it was given its due place in the Army as a definite medical technical specialty and recognized by the Surgeon General as an important branch of medicine. In large measure this was due to Dr. Granger's persistent work and faith in his profession and to his cheerful optimism that was a part of his nature, making it possible for him to overcome all obstacles.

After leaving the service, Dr. Granger gave much of his time to his field of study. He travelled for the advancement of education from coast to coast, lecturing on Physiotherapy. He was closely associated with the Harvard Medical School in their furtherance of education in Physiotherapy under the auspices of the courses for post graduate.

For a number of years, Dr. Granger kept in touch with the Research Department at the Bureau of Standards in Washington, D. C., and one of his greatest hobbies was the standardization of medical electrical apparatus through his work on the Committee, especially formed for that purpose.

He was a good soldier from the start, for no one knew as well as he did that his days were numbered, yet he carried at all times that indomitable cheerful spirit. His unfailing sympathy, his love for his profession and his service for humanity, these can never die, but rather will go marching on and so, our well beloved Dr. Granger, we will continue to think of you and strive to make our lives more worth while because of you and of the influence that you have left behind.

This seems a good opportunity to bring to the notice of our members in other states the laws of Pennsylvania in relation to the physiotherapist.

"Existing laws in Pennsylvania provide that all who seek license to practice the healing art, whether as doctors of medicine, osteopathy, chiropractic, naturopathy, or what-not, shall have the same education, except in their methods of treating sickness. Those not using drugs or surgery may, under the Act of 1911, be licensed as physiotherapists or drugless therapists. A physiotherapist may legally administer treatment, using physical means, only upon diagnosis and prescription by a legally licensed physician."

LICENSE BY EXAMINATION

Applicants for licensure by examination must meet the following requirements:

1. (a) Preliminary education.
2. (b) Professional education.
3. (c) A candidate for admission to the licensing examination must pay a fee of $25.00.
4. (d) Pass satisfactorily the State Board examination.

An act of the General Assembly approved by the Governor on Apr. 2, 1925, calls for the annual registration of all licensed physicians and practitioners of the healing art in Pennsylvania on or before Jan. 1, 1926. It includes all practitioners of medicine, other than osteopaths, and those licensed to practice drugless therapy, physiotherapy (massage and allied branches) and chiropody. The act provides that

> "It shall be the duty of all persons now qualified and engaged in the practice of medicine or any of the allied branches of the healing art, or who shall hereafter be licensed by the Board of Medical Education and Licensure to engage in such practice in the commonwealth of Pennsylvania, to be registered with the said Board of Medical Education and Licensure in the Department of Public Instruction, as practitioners, *on or before the first day of January, one thousand nine hundred and twenty-six*, and thereafter to register in like manner on or before the first day of January of each succeeding year.
>
> "Each person so registered with the Board of Medical Education and Licensure shall pay, for each annual registration and for the certificate hereinafter provided for, *a fee of one dollar* or such other sum as may be fixed by the Department of Public Instruction under authority of law. The money thus received shall be available for the use of the said Board of Medical Education and Licensure *for the purpose of enforcing the provisions of this act against unlicensed, illegal and unregistered practitioners.*
>
> "Any person who shall practice medicine or any of the allied branches of the healing art which come under the provisions of this act, without having been registered in accordance with the provisions of this act shall, on conviction thereof before any magistrate, alderman or justice of the peace in the county where the offense shall have been committed, be subject to a fine of not less than ten dollars and not more than one hundred dollars."

We have two recognized schools in the state: The Philadelphia Orthopædic Hospital, 17th and Summer Sts., Philadelphia, Pa.;

course of eight months; The Graduate School of Medicine Hospital, University of Pennsylvania, 19th and Lombard Sts., Philadelphia, Pa.; course of one year. L. A. W.

A WORD FROM THE BUREAU OF APPOINTMENTS

Although the Bureau of Appointments has been a somewhat silent member of the A. P. A. family, it has not been sleeping all of the time. Right now, the office force, composed of one typewriter, several files and the director, feels the urge to say something to let the family at large know that it is alive and still functioning.

It is astonishing how many letters are received from all parts of the country and even England, asking about courses, positions and membership advantages. I attribute this wide-spread interest, somewhat, to the ads we are carrying in the A. M. A. Journal and Modern Hospital. In reply to many letters referring to positions, I have, in the past few months, sent over thirty membership application blanks and I am glad to say I have noticed many of these names on the lists recently sent me by the treasurer. It is, no doubt, quite a shock to some who receive these blanks to see what our qualifications are, all of which is a boost in our favor.

The Bureau would like to broadcast the positions through station P. T. R., but as that station is only on the air bi-monthly, the positions would be filled by the time the news reached you and the notice would be useless. The best way to get first-hand information is to ask for it yourself, but please be specific about what you want. For the benefit of those who have never come in contact with this branch of the association, it may be well to say that any member in good standing has the privilege of using the Bureau as often as necessary gratis, all debts being paid by the national association. This is the only registry that the A. P. A. sponsors but if there are any local registries affiliated with local chapters, do let me know about them so we can get together and enlarge the scope of the work.

I had a funny experience with the Western Union some time ago and I want to apologize to the five members who received "collect" night letters by mistake. A request came from Wisconsin asking for two physiotherapists. I wrote a night letter immediately with the message, "Telegram received this morning," and sent the names of five members. The boy took my typed message, but instead of carrying out directions, told the office to send individual night letters, collect, to each listed name with the message, "Telegram received this morning," AND THEY DID! I discovered this error next morning and immediately requested the office to correct the mistake, which they promised to do. Hope the girls who received this insane message understand now what it was all about and will accept my apology, although it comes rather late.

There now, that's quite a speech for a bashful Bureau to make, so will stop.

The various offices of the association are constantly receiving returned mail "Not here," "Address unknown," or like statements in red ink. Will every member of the A. P. A. and every subscriber to THE REVIEW make it a business to see that our files contain but one address and that the correct one for herself or himself?

ABSTRACTS BY DR. J. S. COULTER

Physiotherapy or Treatment by Physical Agents. By G. E. Richards, Associate in Radiology, University of Toronto, in University of Toronto Medical Bulletin, Vol. VIII, No. 4, June, 1928, pages 3 to 14.

EFFECTS OF ULTRAVIOLET RAYS

1. Rickets. The effects of ultraviolet rays in this disease may be regarded as a specific therapy.

2. Adenopathy. Simple enlargement of cervical and mediastinal glands in children form a field in which these rays are of the greatest possible value.

3. Tuberculosis. Tuberculous adenopathies are benefited by ultraviolet rays, but the results are slow and treatment must be continued patiently.

4. Tetany. Most observers agree that the results of ultraviolet ray therapy in tetany are almost as specific as in rickets.

5. Skin Diseases. In skin diseases this method has been of less value in our experience than X-rays though there is no doubt of its value in a somewhat restricted field.

6. Most of the Simple Anæmias. Increase in the number of red corpuscles with a corresponding improvement in the hæmoglobin.

INFRA-RED RAYS

They are of value, like diathermy, in any disease or condition for the cure or relief of which heat is known to be of value. In our experience this method of treatment is about on a par with various forms of radiant heat or baking, but not so useful as diathermy.

ELECTRICITY

Of the various forms of electricity in use at the present time that which is known as diathermy is probably the most popular.

The facts are that it is not new and that it is merely another way of applying heat. It has the great advantage, however, that the heat is easily controlled and can be produced within the tissues almost at any chosen point.

1. Gonorrhoeal Epididymitis. The results of treatment by diathermy are quite as spectacular as the treatment of rickets by ultraviolet rays and occur much more promptly.

The same is true but in a more restricted sense of gonorrhoeal arthritis in the acute and sub-acute stages.

2. High Blood Pressure. We came to the conclusion that any reduction of pressure which occurred was due to peripheral dilatation and although the actual reduction might be considerable it did

not last more than a few hours, twelve being about the maximum. Apart from the peripheral dilatation we doubt if there is any other effect in this respect and, therefore, the method is no better than any one of several other methods available for blood pressure reduction.

3. Pneumonia. The only conclusion we felt justified in drawing from this work was that diathermy did not materially affect the death rate of lobar pneumonia in the type of case met with in the public wards of a general hospital.

A few felt benefit from the treatment in the sense of added comfort, relief or dyspnoea, etc., but in others we concluded that this was more than offset by the inconvenience and consequent fatigue of arranging the electrodes and giving the rather prolonged treatment.

4. Neuritis. We have not been able to verify the claims made for diathermy in the treatment of neuritis.

I venture the opinion that the cases treated in which relief has been claimed in neuritis have not been true cases of neuritis, but have been some form of bursitis or more likely myositis.

The latter group, together with sprains, muscle lacerations and recent fractures, form a group in which some of the best results may be obtained which are possible by any form of therapy.

5. The Arthritides. In all forms in which benefit was obtained it was chiefly in relief of pain and swelling.

SURGICAL DIATHERMY

In skilled hands it is a great boon to certain surgical procedures, but, like every instrument of its kind, its real usefulness depends entirely upon the skill with which it is employed.

OTHER FORMS OF ELECTRICITY—GALVANISM

In cases of bursitis and arthritis there is very decided benefit from this method of treatment. It is not an easy method to adapt to office practice and a mistake in the technic may result in a nasty galvanic burn. We feel the procedure should only be used by a thoroughly trained operator.

1. Interrupted Galvanism. Here the contraction is a sudden, short, sharp jerk and, if the current is strong, it may be painful.

2. Sinusoidal Galvanism. The intensity of the current slowly rises to a maximum in a positive phase, as slowly dies away to zero and the whole sequence is then repeated in a negative phase. Such a contraction provides for a period of powerful tonic contraction and a period of rest and is of very great value in forcing the contractions of muscles whose function is diminished.

Has Physiotherapy a Place in the Hospital? Discussion by Dr. F. C. Bell, Supt. Vancouver General Hospital, Vancouver, B. C., before the Round Table Conference on Every Day Hospital Problems, in Bull. Amer. Hos. Assoc., Vol. II, No. 4, October, 1928, pp. 606-9.

"I am in the happy position of administering to a hospital in which the department is, from every point of view, an asset and not a liability. * * *.

"In the first place, a Physiotherapy Department which is an asset to the hospital is presumably one in which the department materially contributes to the welfare of the patient and to his improvement in the treatment * * *.

"The director of the department has equal status with the director of the X-ray department and for administrative purposes comes directly under the general superintendent or his assistants. The director is, of course, a full time employe, a doctor specially trained in his work, but having a very good background gained from several years' experience in the general practice. * * *

"The personnel of the director's department are nominated by him for the work according to their fitness to undertake it. I am referring, of course, to the technician. In addition, the director receives pupils for instruction, and herein, I think, lies to some considerable extent the financial success of the department. * * *

"The equipment of the department is modern and up-to-date, and I do not think it is necessary to say more concerning it. * * * The Department of Physiotherapy, I think, should be located so as to be within easy reach of the wards of the hospital, for both ambulance and stretcher cases, and equally so for the reception of the patients derived from the out-patient department or those who are referred as pay patients for treatment by doctors. A department also should be well ventilated and located, because we can hardly shunt our department into a basement or deprive it of proper hygienic surroundings without making it a matter of criticism.

"With regard to finances, I think the department should have a voice in the preparation of its budget. The director should have the opportunity of discussing with the director of the hospital his estimates for the year. * * *

"In its administration, I conclude that the department should be responsible for its own affairs as long as they are not adverse to the general policy of the hospital.

"If the work of the department is to be carried on economically in view of the equipment provided, or the facilities at disposal, or the number of the personnel, it will be necessary to keep the staff as continuously employed as possible during the day. This will in-

volve a number of questions as far as hospital patients themselves are concerned. * * *

"Another item is the personal attitude of the workers, the technicians, toward the work they are doing. * * * My director lays a good deal of stress on the personal attitude of his technician and pupils toward their patients. The record in such a department should be kept as simple as possible consistent with giving the ordinary statistical information which is called for. * * *

"The scale of charges for treatment varies roughly as between two dollars and four dollars per treatment, dependent upon the particular physical agency which is used. * * *"

The Anti-Rachitic Efficiency of Skyshine in Washington, D. C. By Capt. Wm. D. Fleming, Medical Corps, U. S. Army, in The Mil. Surgeon, Vol. 63, No. 5, November, 1928, pp. 671-2.

This author says in conclusion: "The light received from the north sky (skyshine) without direct sunlight, in Washington, D. C., during the months of April, May, June and July, 1928, afforded sufficient ultraviolet to promote normal ossification in rats confined under a glass permeable to ultraviolet light to a degree of about 29 per cent, these rats being on a diet which produced marked rickets in rats receiving no ultraviolet under window glass. The gain in weight of the rats receiving this amount of ultraviolet was also greater than in the rats under window glass. It appears, therefore, that a solarium designed for ultraviolet therapy and glazed with a glass permeable to ultraviolet to the degree of at least 29 per cent need not be placed on the south side of a building where it will receive direct sunlight, but, at least as far as anti-rachitic therapy is involved, will be effective if it receives the light from only the northern hemisphere of the sky."

The Industrial Physician—His Relation to Patient and Carrier. By James Eaves, M. D., San Francisco, in California and West. Med., Vol. XXIX, No. 4, October, 1928, pages 256-7.

VALUE OF PHYSIOTHERAPY

"It is reasonable to expect that the advanced surgical procedures for rehabilitation and associated treatment now in vogue would increase medical costs, but if these procedures are justified, compensation payments, including permanent disability awards, should be reduced accordingly. On the contrary, these costs have risen. What is the explanation? In no small measure it is due to an abuse, as an easy source of income, of wartime procedures, such as Physiotherapy and purely experimental operations that do not always produce results. Physiotherapy must be intelligently applied.

"If its use was indispensable during the war, in time of peace Physiotherapy can also be of great help in treating injuries of all kinds, including industrial injuries.

"Physiotherapy is employed (1) to increase blood supply in parts affected, improve the circulation, nutrition and metabolism, to absorb infiltrations and effusions and quicken restoration of tissues to normal; (2) to build up muscles that are weakened from disuse after immobilization of fractures, etc.; (3) to reduce or lessen stiffness of joints following long application of splints or after joint injuries; (4) to stimulate nerves, if they are in a state of paresis due to injury; (5) to combat infection.

"Injudicious or protracted use of Physiotherapy or use of it without a diagnosis should be condemned.

"To control the effects of Physiotherapy on patients we use the following scheme:

"Patient is first examined and diagnosed.

"The findings are expressed in the form of Physiotherapy report on special Physiotherapy report blanks, corresponding to the part of the body that was injured.

"Patients are examined periodically and progress is similarly noted.

"Treatment is stopped when there is no further progress."

Heliotherapy (Natural and Artificial)—Its Limitations in Pediatrics. By L. W. Sauer, M. D., in Illinois M. J., Vol. LIV, No. 4, October, 1928, page 298.

"Indications and contraindications for heliotherapy. The following systemic conditions are benefited by heliotherapy; tuberculosis of the bronchial glands, cervical glands, peritoneum, pleura, bones, joints or skin; rickets and tetany; superficial conditions, such as erysipelas, pyodermatoses like impetigo (especially of the newly born), acne, furunculosis, and chronic ulcers of the skin often heal after a few treatments. In the latter, the action is doubtless mainly germicidal. Some clinicians report benefit in delicate, poorly developed children who get infections easily or who are slowly convalescing from infections.

"Bronchitis, asthma, pertussis, enuresis, hay fever, and dry eczema are seldom benefited. Heliotherapy is contraindicated in most febrile diseases, especially in active pulmonary tuberculosis, also in most nervous disorders, especially in chorea."

THE STUDY OF PHYSIOTHERAPY AS A VOCATION

By LUCILE R. GRUNEWALD

(Continued from the October number)

CHAPTER IV

PRESENTATION AND INTERPRETATION OF DATA BASED ON OBJECTIVE II: TO DETERMINE THE NEED OF STANDARDIZATION OF THE PRACTICE IN AND THE TRAINING FOR PHYSIOTHERAPY

The need of standardization of Physiotherapy seems to be keenly felt by the well-trained physiotherapist in southern California. Conferring with the head of the Physiotherapy Department of the Los Angeles General Hospital, she emphatically said, "We need and want standardization. Until we get it we shall not be recognized by the general practitioner." A similar statement was made by the head of the department of Physiotherapy of the Children's Hospital of Los Angeles. Following these conferences, letters were sent to sixteen general practitioners asking them if they referred patients to physiotherapists and if there were standardization, would they refer more patients to physiotherapists. The replies with the exception of one were in the affirmative and this one said, "I do not believe so," showing he was not quite sure how he felt. At a meeting of the Southern California Physiotherapy Association, the writer led a discussion on the standardization of training and it was the consensus of opinion that there was a decided need of standardization, especially in this section of the country where there are so many pseudo-physiotherapists practicing, and where there is no state legislation on the licensing of physiotherapists.

In the states where there is legislation, controlling the practice of Physiotherapy, there are, however, wide differences in requirements. In Pennsylvania, for example, the preliminary requirement is a grammar school education and the professional requirement is a course in both practice and theory of all branches of Physiotherapy of not less than eight consecutive months in a school approved by the State Board of Medical Education and Licensure.[1] The school approved is the Orthopedic Hospital, Philadelphia, and it has, as an entrance requirement, two years of high school education, or its equivalent, and offers an eight months' course in Physiotherapy. Applicants must be at least 21 years of age.[2] The state law requires all applicants, including graduates of this school, who wish to practice in the state of Pennsylvania, to take the State Board Examinations.

In contrast to Pennsylvania, New York state has the following requirements:

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[1] Department of Public Instruction, State Board of Medical Education and Licensure, Harrisburg, Pa. *Bulletin No. 19* in January, 1926. pp. 12-12.

[2] *Circular of Information.* School of Massage, Electricity and Allied Branches. Philadelphia Orthopaedic Hospital and Infirmary for Nervous Diseases. October, 1927.

"Admission to practice. Applicants who were engaged in the study of Physiotherapy, May 17, 1926, may secure a license by passing an examination conducted by the department. Admission to such examination may be secured upon certification by certificate and affidavit to the department that such applicant has been graduated from an approved secondary school and from a Physiotherapy school or college in the United States with credentials satisfactory to the department and from a course of satisfactory study of not less than two years. The subjects for examination are anatomy, physiology, pathology, hygiene, chemistry, gynecology, and the theory and practice of Physiotherapy. . . .

"Students matriculating after May 17, 1926, must study Physiotherapy not less than four years including four satisfactory courses of not less than seven months each in four different calendar years in a school maintaining a standard satisfactory to the Education Department."[3]

Illinois, on July 1, 1926, also raised its requirements from a three-year course to a four-year course of instruction in an institution of good standing, with a high school education as a prerequisite.[4]

In Wisconsin licenses are granted only for the practice of massage or hydrotherapy or educational gymnastics and to those applicants who have graduated from an accredited high school and who have taken courses in a professional school or college in physiology, descriptive anatomy, pathology and hygiene and who have successfully passed the state examinations.[5]

The two states, New York and Illinois, having the two largest cities, New York City and Chicago, have the best legislation and in 1926 both raised their requirements. In September, 1927, New York University announced a four-year course in physical therapy, leading to a degree of Bachelor of Science, authorized by the state of New York and meeting the requirements for the New York license in physical therapy.

The difference in requirements for Physiotherapy aides set forth in the United States Civil Service Commission and Civil Service Commission of several cities is a further indication of a need for a standardization. The United States Civil Service Commission has the following requirements in education, training and experience for Physiotherapy aides:

"*General Requirement.*—For either position, applicants must have been graduated from a standard high-school course or have completed 14 units of high-school work accepted for college entrance; provided, however, that those who do not meet this requirement but

[3] The University of the state of New York, Handbook 9, Higher Education Medicine. *Laws, Rules and Information.* June, 1927. pp. 108-109.

[4] Department Legislation and Education. *State of Illinois Medical Practice Act.* Senate Bill No. 439. Springfield, 1927. pp. 5-6.

[5] State of Wisconsin. *Reprint from Legislative Act 425-A,* Chap. 482. Laws of 1919.

who are otherwise qualified, will be given a noncompetitive mental test in lieu thereof in which they will be required to attain a rating of at least 50, exclusive of military preference credit, and which will require one hour and 15 minutes. If a competitor is required to take this test this fact will be stated on the competitor's admission card.

"Physiotherapy Aide.—In addition to meeting the above requirement, applicants must show that they meet the requirements specified in one of the following groups:

"(a) Graduation from a recognized normal school of physical education with a course covering three scholastic years, plus six months' experience in administering Physiotherapy, or attendance at such school for a period of two scholastic years, plus one year of such experience.

"(b) Attendance at a recognized school of Physiotherapy for a period of at least two scholastic years of nine months each, plus at least six months' experience in administering Physiotherapy during training or subsequent thereto, or attendance at such a school for one scholastic year, plus nine months of subsequent experience in administering Physiotherapy.

"(c) Attendance at a recognized school of medicine for a period of at least two scholastic years or graduation from a recognized school of nursing, requiring a residence of at least three years in a hospital having a daily average of 30 patients or more, plus, in either case, six months' experience in administering Physiotherapy.

"(d) Two years of institutional experience as a Physiotherapy aide, pupil aide, or Physiotherapy assistant.

"(e) Any equivalent combination of the above.

"Note.—General experience as graduate nurse, chiropractor, osteopath, doctor of medicine in general practice, or a similar character, will not be regarded as experience in Physiotherapy for aide. Experience as aide in the Federal medical service will be credited as institutional.

"Physiotherapy Pupil Aide.—For the position of Physiotherapy pupil aide no definite amount of such training and experience is prescribed, but in rating this subject credit will be given for any established.

"The paragraph under which experience is claimed should be indicated in making application and appropriate certificates filed to corroborate the claim.

"Applicants for the position of aide who fail to establish the required experience will be rated and examined for pupil aide."[6]

The Los Angeles County Civil Service Commission states its requirements for Physiotherapy as follows:

[6] United States Civil Service Examinations—Physiotherapy Aide—Physiotherapy Pupil Aide. No. 30 (assembled) c 39. Issued Jan. 10, 1928.

"Age: At least 22 years.

"Experience: Must have had at least two years' special training and experience in the practical administration of Physiotherapy.

"General Qualifications: Must be personally familiar with and skilled in the use of the various forms of Physiotherapy and the operation of necessary equipment. Candidates must possess executive ability and be temperamentally fitted to deal with patients and their physicians. Practice as a masseur, attendant, etc., will not in itself be accepted as qualifying. Graduate nurse's training is desirable, but not essential. Credit will be given to graduate nurses."[1]

In a letter from the office of the Civil Service Commission of the city of Detroit it is stated that there is a classification for Physiotherapy but their charter does not permit the fixing of prerequisites relative to training, experience, etc., but relies on the demonstration of ability in the examination, at which time experience and training are considered.

The Executive Secretary of the Division of Civil Service of the Department of Civil Service and Registration of the Commonwealth of Massachusetts says that at the present time there is only one institution where these persons (Physiotherapy aides) are under civil service and that is the Boston City Hospital. In view of the difficulty in obtaining applicants for these positions it is customary to authorize the head of the institution to select a person for noncompetitive examination. The subjects and weights of this examination generally consist of a statement of training and experience, with a weight of 4; practical questions to test the previous knowledge of the applicants, with a weight of 3; and an oral interview to determine personality and fitness, also with a weight of 3.

The Civil Service Commission of the city of Philadelphia changed its requirements for head physiotherapist in 1925 so that the physiotherapist had to be a graduate physician of a recognized medical school instead of graduate physician or graduate of a school of physical instruction as in 1923.

The difference in length of training offered by the various schools of Physiotherapy is also indicative of the need of standardization. We have the two extremes, one school having an eight-months' course in Physiotherapy with a prerequisite of two years of high school instruction or its equivalent, with another institution requiring four years of college education including 28 units of physical therapy in a hospital and granting a Bachelor of Science Degree on the completion of course. Two schools of physical education offer an alternative for the third year, either the teaching of physical education or the specialization in Physiotherapy. The Federal government offers a six-months' training course in Physiotherapy and applicants must be

[1] Official Bulletin, Los Angeles County Civil Service Commission. Vol. 15, No. 133, Oct. 5, 1927.

graduates of accredited schools of physical education which have courses of not less than two years. Another school of Physiotherapy offers a year's course and a postgraduate year with the following entrance requirements: "Prospective students must have graduated from a four-year high school or its equivalent and, in addition, must have had at least two years in nursing, normal physical education, or two years of college credits. Special pupils, having graduated from high school only, may be accepted *on probation.*"[8]

The following tables compiled from answers on the questionnaires of seventy-six physiotherapists show wide differences in education and training. This also indicates the need of standardization.

TABLE 3—SHOWING THE VARIATION IN EDUCATION AND TRAINING OF 76 PRACTICING PHYSIOTHERAPISTS

Number holding Bachelor's Degree	21
Number holding Master's Degree	3
Number holding Doctor of Osteopathy Degree and Master's Degree	1
Number who have had physical education training	61
Number who have had physical education training in a college or university	26
Number who have had physical education training in a special school of physical education	35
Number who have had nurse's training	7
Number who have had only training in Physiotherapy (No physical education or nurses' training)	4

TABLE 4—SHOWING THE VARIATION IN THE SPECIAL COURSES IN PHYSIOTHERAPY TAKEN BY 63 PRACTICING PHYSIOTHERAPISTS

Number of physiotherapists who took special courses in Physiotherapy	63
Number whose special course in Physiotherapy was chiefly massage and therapeutic exercise	14
Number whose special course in Physiotherapy was chiefly electro-therapy	16
Number whose special course in Physiotherapy included all four branches	13
Number of physiotherapists whose special course was in reconstruction aide training	12
Number of physiotherapists whose special course in Physiotherapy was muscle training	8

TABLE 5—SHOWING THE VARIATION IN THE LENGTH OF THE SPECIAL COURSES IN PHYSIOTHERAPY TAKEN BY 57 PHYSIOTHERAPISTS

Number who took a 6 weeks' course in Physiotherapy	12
Number who took a 2 months' course in Physiotherapy	10
Number who took a 3 months' course in Physiotherapy	8
Number who took a 4 months' course in Physiotherapy	2
Number who took a 5 months' course in Physiotherapy	1
Number who took a 6 months' course in Physiotherapy	11
Number who took a 7 months' course in Physiotherapy	1
Number who took a 9 months' course in Physiotherapy	1
Number who took a 1 year course in Physiotherapy	7
Number who took a 1 and ½ year course in Physiotherapy	2
Number who took a 2 year course in Physiotherapy	2

In answer to this question in the questionnaires, "Are you given the responsibility of deciding on the specific type and kind of treat-

[8] *The New Haven School of Physiotherapy*—ninth year. 1927-1928. p. 7.

ment?" there were fifty-three replies in the affirmative. Some of these replies were qualified, as, "sometimes," "at times," "often," "generally," "partially," "with some physicians." One of our leading surgeons in Boston, speaking before a gathering of medical men, made the statement: "When I call in a physiotherapist, I expect the same kind of response as when I call in a neurologist—I know what I want accomplished, but I don't know Physiotherapy, but I do expect my physiotherapist to know it."[9] This responsibility given to the physiotherapist makes it seem very necessary that she have a good background of education, training and experience. "If we are to stand alongside the doctor, in many cases, as his right-hand helper," Miss McMillan says, "we must have not merely trained individuals but we must have girls with character and personality."[10]

Standards in the education and training of physiotherapists, and also in the Federal, state and city requirements for the practice of Physiotherapy, are most essential.

The data presented in this chapter show that there is a definite need of the standardization of the practice in and the training for Physiotherapy.

[9] McMillan, Mary. "The Physiotherapist." Mary Hemenway Alumnae Association Graduate, Department of Hygiene and Physical Education. *Wellesley College Bulletin.* March, 1927.

[10] Ibid.

(To be continued)

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

Of THE PHYSIOTHERAPY REVIEW, published bi-monthly at Mount Morris, Illinois, for October, 1928.

State of New Jersey } ss.
County of Essex }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Dorothea M. Beck, who, having been duly sworn according to law, deposes and says that she is the editor of THE PHYSIOTHERAPY REVIEW and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Kable Brothers Company, Mount Morris, Illinois; Editor, Miss Dorothea M. Beck, Montclair, New Jersey; Business Manager, Miss Irene C. Mezek, Chicago, Ill.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) The American Physiotherapy Association—President, Miss Hazel Furscott, San Francisco, California; Secretary, Miss Charlotte Ballard, San Francisco, California; Treasurer, Miss Florence Burrell, Oakland, California.

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DOROTHEA M. BECK, Editor.

Sworn to and subscribed before me this Ninth day of October, 1928.

(Seal) ERLAND M. NELSON.

(My commission expires April 8, 1932.)

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Children's Hospital, Sunset and Vermont Aves., Los Angeles, Calif., Miss L. H. Graham.

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M.B., D.M.R.E., M.R.C.P.

From a paper read before the Southport Division of the British Medical Association, Mar. 30, 1928 (British Medical Journal, July 14, 1928)

Reprint No. 587 of the above article in full will be sent on request.

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